

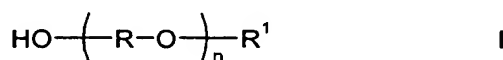
We claim:

1. A copolymer obtainable by free-radical polymerization of

- (A) at least one monoethylenically unsaturated C<sub>4</sub>-C<sub>8</sub>-dicarboxylic anhydride,  
 (B) at least one vinylaromatic compound from the group consisting of styrene  
 and substituted styrenes and  
 (C) at least one monoethylenically unsaturated monomer which contains at  
 least one heteroatom and is different from (A),

and partial esterification of the resulting copolymer with

- (D) alcohol alkoxylates of the formula I



in which the variables have the following meanings:

R is C<sub>2</sub>-C<sub>6</sub>-alkylene radicals, which, when n is > 1, may be identical or different;

R<sup>1</sup> is C<sub>1</sub>-C<sub>30</sub>-alkyl;

n is 1 to 200,

and if desired hydrolysis of the anhydride groups still present in the copolymer to give carboxyl groups.

2. A copolymer as claimed in claim 1, in which the molar ratios of (B) to (A) and of (C) to (A) are each in the range from 0.1:1 to 10:1 and the molar ratio of [(B) + (C)] to (A) is 20:1 to 1:2.
3. A copolymer as claimed in claim 1 or 2, in which 5 to 80% of the carboxyl groups present are esterified.
4. A copolymer as claimed in claims 1 to 3, in which the anhydride groups still present are hydrolyzed to carboxyl groups.
5. A copolymer as claimed in claims 1 to 4, which comprises maleic anhydride as monomer (A).
6. A copolymer as claimed in claims 1 to 5, which comprises styrene as monomer (B).

7. A copolymer as claimed in any of claims 1 to 6, which comprises (meth)acrylic acid, (meth)acrylic esters or amides, vinyl alkyl ethers, N-vinylformamide, N-vinylpyrrolidone, 1-vinylimidazole or 4-vinylpyridine as monomer (C).
8. The use of copolymers as claimed in any of claims 1 to 7 as additive for detergents and cleaners.
9. The use of copolymers as claimed in any of claims 1 to 7 as graying-inhibiting additive in detergents.
10. The use of copolymers as claimed in any of claims 1 to 7 as detergency-boosting additive in detergents.
11. A detergent formulation which comprises copolymers as claimed in any of claims 1 to 7 as additive.
12. A solid detergent formulation comprising
  - (a) 0.05 to 20% by weight of at least one copolymer as claimed in any of claims 1 to 7,
  - (b) 0.5 to 40% by weight of at least one nonionic, anionic and/or cationic surfactant,
  - (c) 0.5 to 50% by weight of an inorganic builder,
  - (d) 0 to 10% by weight of an organic cobuilder and
  - (e) 0 to 60% by weight of other customary ingredients, such as extenders, enzymes, perfume, complexing agents, corrosion inhibitors, bleaches, bleach activators, bleach catalysts, color transfer inhibitors, further graying inhibitors, soil release polyesters, fiber and color protection additives, silicones, dyes, bactericides, dissolution improvers and/or disintegrants,where the sum of components (a) to (e) is 100% by weight.
13. A liquid detergent formulation comprising
  - (a) 0.05 to 20% by weight of at least one copolymer as claimed in any of claims 1 to 7,
  - (b) 0.5 to 40% by weight of at least one nonionic, anionic and/or cationic surfactant,

- (c) 0 to 20% by weight of an inorganic builder,
- (d) 0 to 10% by weight of an organic cobuilder,
- (e) 0 to 60% by weight of other customary ingredients, such as sodium carbonate, enzymes, perfume, complexing agents, corrosion inhibitors, bleaches, bleach activators, bleach catalysts, color transfer inhibitors, further graying inhibitors, soil release polyesters, fiber and color protection additives, silicones, dyes, bactericides, organic solvents, solubility promoters, hydrotropes, thickeners and/or alkanolamines and
- (f) 0 to 99.45% by weight of water.

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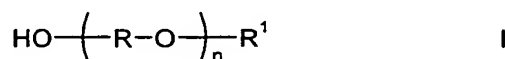
Partially esterified copolymers of monoethylenically unsaturated dicarboxylic anhydrides, vinylaromatic compounds and further monoethylenically unsaturated monomers containing heteroatoms

# Abstract

- 5 Copolymers obtainable by free-radical polymerization of
- (A) at least one monoethylenically unsaturated C<sub>4</sub>-C<sub>8</sub>-dicarboxylic anhydride,
  - (B) at least one vinylaromatic compound from the group consisting of styrene and substituted styrenes and
  - (C) at least one monoethylenically unsaturated monomer which contains at least  
10 one heteroatom and is different from (A),

and partial esterification of the resulting copolymers with

- (D) alcohol alkoxylates of the formula I



in which the variables have the following meanings:

- 15 R is C<sub>2</sub>-C<sub>6</sub>-alkylene radicals, which, when n is > 1, may be identical or different;
- R<sup>1</sup> is C<sub>1</sub>-C<sub>30</sub>-alkyl;
- n is 1 to 200,

- 20 and if desired hydrolysis of the anhydride groups still present in the copolymers to give carboxyl groups,

and use of the copolymers as additive for detergents and cleaners.